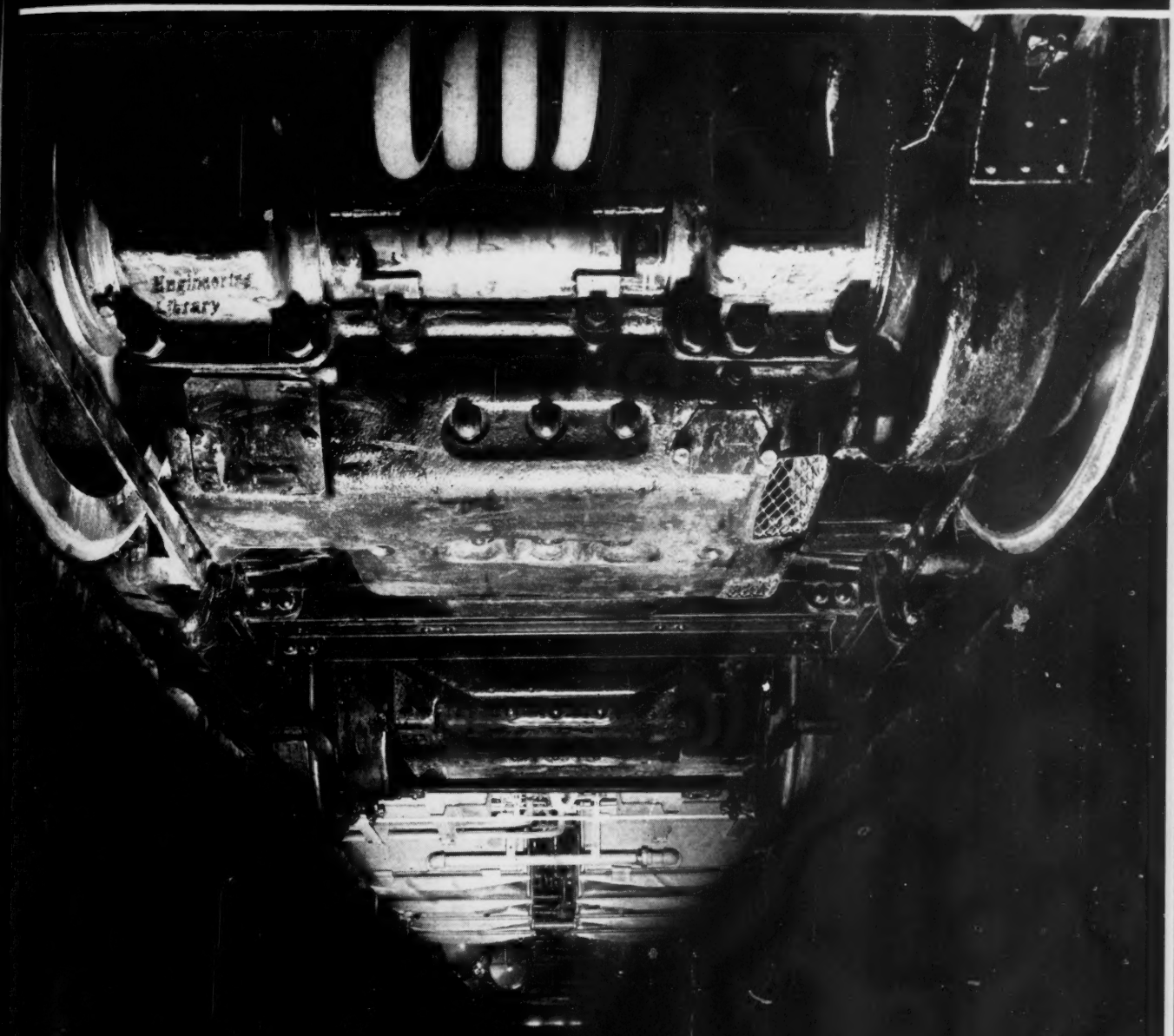
Industrial Standardization

and Commercial Standards Monthly



February

See Article on Page 31

1937

This Issue: *Front Cover: 275 hp traction motors of a stream-lined diesel-electric train. Courtesy Westinghouse Electric & Manufacturing Co. Photo by Johnston & Johnston.*

ASA

AMERICAN STANDARDS ASSOCIATION

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Revised Railroad Standard Recognizes Light-Weight Motors, New Designs

New motors, revolutionizing railway construction, permit design of light-weight, high-speed, stream-lined electric trains

Needed changes in motor standard provide higher armature peripheral speeds, higher permissible temperatures, better and more ventilation; Suggest new "thermal capacity rating"

by

Norman W. Storer

Chairman, Sectional Committee on Rotating Electrical Equipment for Rail Cars and Locomotives

THE Standards for Railway Motors of the American Institute of Electrical Engineers, which have for many years been accepted in this country as the "last word" and have had an enviable reputation in all other parts of the civilized world, are now to be superseded by the new American Standards for Rotating Electrical Equipment for Rail Cars and Locomotives, which will soon be published.

Compiled by Sectional Committee C35 under the leadership of the American Institute of Electrical Engineers, these standards are based on many years of experience in the design and operation of railway motors and generators. They are necessary at this time not only to bring the A.I.E.E. standards for railway motors up to date, but to develop standards, especially, for gas and Diesel-electric equipments, the manufacture of which has grown to large proportions.

They have been adopted as "American *Tentative* Standards" because the new types of machinery covered by them have heretofore had no definite standards, and such standards must therefore be developed. It is also important to leave the door open for changes if any are necessary,

Our Front Cover

shows the under side of the motor unit of the Gulf, Mobile, and Northern's stream-lined diesel-electric train, The Rebel. The two 275-horsepower traction motors may be seen toward the top of the picture.

in order to come to an agreement with the International Electrotechnical Commission.

The necessity for bringing the railway motor standards up to date will be apparent when the developments of the last few years are considered. The motor designers have been very active, and have wrought wonderful results. The problem has had the most intensive study, and advantage has been taken of every improvement in materials, processes, new discoveries, and operating experience, with the result that there has been a gradual shrinkage in the dimensions and weight of the motor that is truly remarkable.

Reduce Weight 80 Per Cent

Twenty years ago, the street car motor weighed in the order of 40 to 50 lb per hp—*at the one hour rating.* Today street car motors are being built weighing 8 to 12 lb per hp *at the continuous rating.*

Until very recently, the almost universal practice was to mount one side of the street-car motor on the axle, support the other side on the truck, and gear the armature to the axle through a single train of gears. That practice has been practically superseded for street-car motors by removing the motor entirely from the axle, carrying it on separate springs, or mounting it rigidly on the truck, and driving either through a double-reduction gear unit carried on the axle, or through a "right-angle drive" and a hypoid gear. In either case, the motor is relieved of the pounding of the track, and the track and special work are relieved of the pounding due to the dead weight of motor on the axle, both results being very desirable.

These light-weight motors together with the light-weight car construction recently developed have given the street railway a new lease of life and made possible the high-speed stream-lined Diesel electric trains that have recently been so much in the public eye. In the Diesel electric trains, the weight of the power plant and motors, with the car to carry them, form a considerable part of the total weight of the train, so that, because the weight reductions outlined apply to both motors and generators, the total reduction is a very important amount.

The question arises as to how this great reduction has been accomplished. There are three important factors that are directly responsible:

(1). Higher armature peripheral speeds;
(2). Higher permissible temperatures;
(3). Better and more ventilation.

(1). The output of a given size of motor with a given current capacity increases as the rated voltage and speed increase, to a certain point, then more slowly as the torque begins to fall due to core loss and windage until maximum voltage or the maximum speed is reached. Hence, other things being satisfactory, it is desirable to operate at as high a speed as is feasible with the gearing

"The Rebel," the Gulf, Mobile and Northern's streamlined, diesel-electric train. Light-weight motors, to which the newly approved revisions in the tentative standards for Rotating Electric Equipment for Rail Cars and Locomotives apply, made it possible to design trains such as this.

Courtesy Westinghouse Elec. & Mfg. Co. *Photo by Johnston & Johnston*

available. Higher speeds now used were made possible by refinements in the detail construction of armatures and commutators, perfect balance, roller bearings and improved gears.

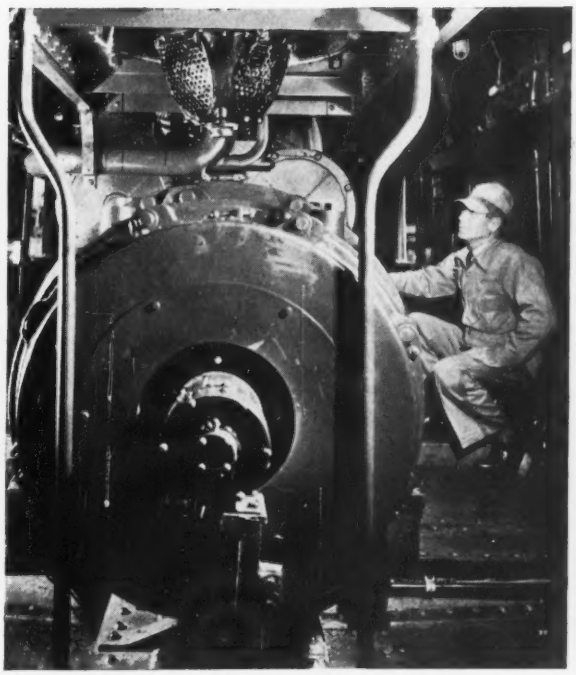
(2). The rise in the temperature of a railway motor has always been *one* of the most important, if not *the most* important, limits. Of course, the motor must be strong enough mechanically and must commutate satisfactorily. After these features are secured, the rise in temperature fixes the rating. Hence, any increase in the permissible temperature rise will permit an increased rating. There has been a great deal of experience in the last 20 or more years with insulation made of incombustible materials such as mica and asbestos, known as Class B insulation, which has convinced the committee that the temperature rises given in the A.I.E.E. Rules can safely be raised for Class B insulation. It has, therefore, been increased from 105 up to 120 C rise at the continuous rating, measured by the resistance method. This is a conservative increase based on the large number of motors which have been operating for years at such temperature rises.

(3). Twenty-five years ago, it was the general practice to operate with street-car motors completely enclosed. Locomotive motors were in some cases cooled by forcing a stream of air through them by motor-driven blowers. The use of fans on the armature shafts, inside of the motor frames, was just beginning. Both of these methods of cooling railway motors have been carried to what appears at the moment to be the ultimate limit and have made tremendous increases in motor capacity.

Increase Peripheral Speeds 70 Per Cent

In no class of railway motors have speed and ventilation been carried to greater extremes than in the single-phase motors for the Pennsylvania Railroad for their multiple-unit trains and streamlined passenger locomotives. There, peripheral speeds of armature and commutator are approximately 12,000 and 9,000 ft per min respectively, which are about 70 per cent above the speeds of a few years ago. There, a veritable hurricane is blown through the motors. There, the weight per hp was brought down below that of dc motors designed only a few years ago, which made it entirely practicable to equip a single-phase passenger locomotive with motive power capable of slipping its wheels with the maximum permissible weight on the drivers and still be able to develop the full motor rating at 90 mph.

With such motors as these, the old methods of rating fall short of the requirements. The continuous rating becomes practically the same as the one-hour rating due to the rapid ventilation.



Courtesy Westinghouse Elec. & Mfg. Co.
Photo by Johnston & Johnston

The 450 kw generator attached to the "Rebel's" 660 hp diesel engine—another type of equipment covered by the revised American Tentative Standards.

The one-hour rating is of little, if any, value as a measure of the thermal capacity of the motor, and many engineers have advocated dropping it, but while admitting its small value, the committee feels that it should be continued until a better measure of thermal capacity is agreed upon.

For these reasons, the committee offers a "Thermal Capacity Rating" in the Appendix. A number of schemes have been suggested but none has yet had any extensive test. The method proposed will add very little to the cost of the usual tests and should, if properly tested, give a good measure of thermal capacity, which is practically the same as overload capacity. The committee asks for a fair trial of it and the results obtained.

Altogether these rules represent the best thought of the committee that compiled them. The committee consists of two members each from four national organizations which are vitally interested. They are as follows:

American Transit Association:

H. H. Adams, Supt. Shops & Equipment, Chicago Surface Lines, Chicago, Ill.

R. H. Dalgleish, Chief Engineer, Capital Transit Co., Washington, D. C.

National Electrical Manufacturers Association:

S. B. Cooper, Railway Sales Dept., Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

M. R. Hanna, Engineer, Motor Division, Transport. Dept., General Electric Co., Erie, Pa.

American Railway Association:

J. E. Sharpley, Elec. Engr., The Virginian R. R., Princeton, W. Va.

Sidney Withington, Elec. Engr., New York, New Haven and Hartford R. R., New Haven, Conn.

J. V. B. Duer, (Alternate) Chief Elec. Engr., Pennsylvania R. R., Philadelphia, Pa.

W. S. H. Hamilton, (Alternate) Equip. Elec. Engr., New York Central R. R., New York City

American Institute of Electrical Engineers —(Sponsor):

Edward L. Moreland, Consulting Engr., Jackson & Moreland; also Head of Dept. of Elec. Engg., Massachusetts Institute of Technology.

Norman W. Storer, Chairman, formerly Consulting Railway Engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Australian Standard For Sheets, Pillowslips

The Standards Association of Australia has just published a new Australian standard specification for materials for bed sheets, draw sheets, and pillowslips or covers for use in hospitals.

The specifications are part of a series dealing with supplies for public institutions, and are intended to assist hospital administrations to specify such requirements for sheeting as will result in bids offered for good economical qualities of sheeting.

The specifications have clauses dealing with types of sheeting, yarn, finish, particulars of fabrics, tensile strength tests, shrinkage, and identification marking of unbleached sheeting.

Materials and dimensions of pillowslips are also covered.

Copies of the specifications may be obtained through the office of the American Standards Association.

SAE Paper Tells Results of Navy's Fuel Research

Fundamental requirements for Diesel engine fuels for use by the U. S. Navy are outlined in a paper presented by Lieutenant Commander R. F. Good at the Society of Automotive Engineers' Annual Meeting, January 11 to 15.

The Naval Engineering Experiment Station at Annapolis has been studying fuels for Diesel engines since 1934 as a basis for revision of the Navy's fuel specifications. Lieutenant Commander Good's address "Cetane Numbers, Life Size" presents the results of the research on Diesel fuel ignition quality with respect to engine performance and maintenance, one of the fundamental requirements for a fuel acceptable for Navy use.

Copies of the paper, which has been made available by the SAE to stimulate discussion, may be obtained from the Society of Automotive Engineers, 29 W. 39th Street, New York, at 50 cents.

Federal Specifications Approved and Available

The following Federal Specifications have been approved for all Government purchases of the material covered, and copies are now available:

Bottles; Prescription DD-B-591
Cement; Masonry SS-C-181a
Compound; Plumbing-Fixture-Setting HH-C-536
Cylinders; Steel, Seamless, Type 3A (for Compressed Gases) RR-C-901
Gaskets; Plumbing-Fixture-Setting HH-G-116
Machines, Coffee-Grinding; Electrically Operated OO-M-23
Panelboards; Equipped with Fuse-Connections, or Switches and Fuse-Connections W-P-146
Plaster; Adhesive, Surgical U-P-401
Tile, Wall; Enameled-Iron RR-T-421
Tires; Automobile and Motor-Cycle, Pneumatic ZZ-T-381b
Tubes; Automobile and Motor-Cycle, Inner ZZ-T-721b

Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at five cents.

Recommendations on Boxes Reaffirmed Without Change

Simplified Practice Recommendations R126-31, Set-Up Boxes; R127-31, Folding Boxes; R128-31, Corrugated Boxes; and R129-31, Notion and Millinery Bags, have been reaffirmed without change by the Standing Committees in charge, the Division of Simplified Practice, National Bureau of Standards, recently announced.

These recommendations for packing and wrapping supplies used by dry goods and specialty stores cover simplified lists of stock sizes for boxes and bags.

Copies may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at five cents each.

Standard Insulating Oil Tests Protect Electrical Apparatus

by

E. A. Snyder[1]

Chairman, Subcommittee IV on Electrical Insulating Oils, A.S.T.M. Technical Committee on Insulating Materials

OILS used as an insulating or cooling medium in electrical apparatus, such as transformers, oil circuit breakers, etc., must be free of water, iron scale, carbon particles, or other impurities which might act as a conductor. The need for a scientific method of test to determine the presence of such foreign materials resulted in 1921 in the development of Tentative Standard Methods of Testing Electrical Insulating Oils by a committee of the American Society for Testing Materials.

Continuing its work on the problem this committee revised the standard tests several times, the latest revision having just been completed and approved.

National sanction of these tests by all groups concerned was accomplished through a sectional committee on Insulating Materials in General operating under the procedure of the American Standards Association, and composed of representatives of these groups. The committee reviewed the standard and recommended its approval by the ASA.

The latest revision of the American Standard Methods of Testing Electrical Insulating Oils (C59.2-1937; A.S.T.M. D 117-36), just approved by the American Standards Association, is the occasion for publication of this review of the work.

Mr. Snyder, chairman of the A.S.T.M. subcommittee, here tells why scientific tests are necessary, how the work was started, what has been accomplished, and how the program is being expanded.

IN 1887 the first static transformer was built commercially. In 1894 the first successful oil-immersed transformers of units of about 25 kva and 2,000 volts were developed, but even as late as 1896 oil-immersed transformers of large sizes were looked upon with distrust because of the supposedly great fire hazard involved. Experience in succeeding years, however, rapidly developed the oil-immersed transformer and subsequently developed the use of oil for insulation purposes in other electrical equipment, such as switches, cables, capacitors, etc. Today the manufacture of petroleum insulating oils has grown into a highly specialized industry of major importance to the electrical equipment field.

Early in the development of petroleum insulating oils as a major insulation for electrical equipment, it was found necessary to know something about the degree of dryness of the oil. Failures of fibrous insulation immersed in oil were traced to the presence of a small amount of moisture in the oil which was absorbed by the fibrous insulation with subsequent breakdown at the point of absorption. The first test developed to determine the presence of moisture was the hot-nail test in which an iron nail was heated to redness and dropped into the oil. Presence of moisture was evidenced by the crackling of the oil, due to the contaminating moisture turning to steam upon contact with the red-hot nail. This was a crude but fairly satisfactory test to determine the presence of moisture, but it did not detect the presence of iron scale or carbon particles or other impurities that would act as a conductor, and the major electrical manufacturing companies were soon working to develop a better and more scientific method of test.

This led to the early development of a dielectric strength test procedure in which a sample of oil was stressed between metal terminals and the voltage needed to cause a discharge of electricity through the oil and between the terminals was noted. Each company and individual experi-

[1]Lubricating Department, Socony-Vacuum Oil Company, New York.

menter in this field had his own ideas as to the best way of conducting this test, and there was no uniform test procedure.

Tests Widely Used

In order to secure such uniformity the problem was taken up by Committee D-9 of the American Society for Testing Materials. After a great deal of work by this committee, in cooperation with the electrical manufacturers, an agreement was reached covering the type of electrodes and spacing, voltage for test, and application of voltage, and a standard method was prepared. This method, with modifications and revisions that were developed from time to time, is now the universal American test method. It also was the nucleus of A.S.T.M. Standard Method D-117 around which from time to time the other parts of the method have been built.

Because of the fact that very minute traces of impurities or moisture adversely affect the dielectric strength test, it was soon evident that a definite method for sampling the oil from drums, tank cars, and other containers was needed. Such a method was added to the standard and while it helped to eliminate a great many dielectric strength test discrepancies which were due to contamination of the sample, it was not explicit enough to eliminate all sources of error.

In 1924 the International Electrotechnical Commission started active work to develop international test methods for insulating oil. It was discovered early in the work that a great deal of the cause for the non-uniformity in test results was due to contaminated samples because of inadequate sampling precautions. It was agreed at that time that the A.S.T.M. method, while not entirely satisfactory, was the best so far published and an international committee composed of representatives from Great Britain and the United States was appointed to revise the procedure and put in all precautions necessary to make it fool-proof. The writer was a member of the United States committee which undertook this revision.

Eliminates Contamination

The present test method is the result of that subcommittee's work. Since its publication there has been very little trouble from contaminated samples when the details of this sampling procedure have been followed explicitly.

After this nucleus of the method had been published, there arose questions from time to time as to other tests ordinarily made on insulating oils but not made on lubricating oils. As a result, methods for determining mineral acids and free and corrosive sulphur were soon developed and incorporated. Recently, a special method for saponification number has been developed.

Other tests covering viscosity, color, flash point, pour point, neutralization number, and steam emulsion value, in which the test procedure needed to be no different than that used on lubricating oils, were referred to the A.S.T.M. Standard D-2 Lubricating Oil procedures.

The present tentative revision of the standard for color refers, of course, to the Union Colorimeter Method D155-34T developed by Committee D-2. This method is not very important so far as insulating oil is concerned because color alone is no measure of the quality of insulating oil. It is merely included in the method because some of the operating companies demanded some quick scheme for determining whether consecutive shipments of oil from their suppliers ran uniform in color, thus giving some assurance of uniformity of source.

Impurities Cause Breakdowns

As previously stated, the most important tests so far covered in D117 are the dielectric strength test and the sampling method. This can be readily understood when it is realized that small amounts of impurities or moisture, which might lower the dielectric strength of the oil, might possibly cause the breakdown of the transformer or switch or other electrical apparatus because of the moisture or impurities getting into the insulation and causing a short circuit. It is necessary for operating companies to keep the dielectric strength of the oil in the apparatus up to safe values and, consequently, it is necessary for them periodically to take samples from transformers or switches in service to determine this characteristic. In order that misleading results may not be obtained, it is equally imperative that samples so taken shall be taken under conditions which will insure the exclusion of moisture or other impurities from sources outside of the apparatus. For example, a sample should not be removed from a transformer on a very humid or rainy day, and, also, care should be taken to see that the testing thief and sample receptacle are absolutely dry.

The other test methods incorporated in the standard, such as viscosity, neutralization number, and mineral acids, are also sometimes of importance as control tests during operation. For example, the viscosity might, on routine control tests, suddenly show to be very much higher. We have had such an experience in the field and found that it was not due to any change in the original oil itself but was caused by some carelessness in adding the wrong kind of make-up oil to the transformer. In the case of neutralization number it is necessary to take care that the acidity value of the oil, due to excessive oxidation or

other causes, does not increase beyond a safe limit. A very sudden increase or a gradual increase beyond a reasonable limit would be an indication of a danger point where the insulation might possibly break down and consequently ruin a piece of apparatus. We have heard of an experience in the field where a test for mineral acids —namely, chlorides—caught a dangerous condition before failure of the apparatus. A transformer installed near a chemical plant which was discharging chloride vapors and dust into the air gradually accumulated, through its normal breathing, a rather large amount of chlorides in the oil. If this had not been discovered in time, the oil removed, and the transformer cleaned, it would have led eventually to the breakdown of an expensive piece of equipment.

More Work Needed

The other test methods incorporated in the standard such as color, flash point, and pour point are mainly of importance as routine control tests to determine whether successive shipments of oil are uniform in character.

While this test method to date incorporates many important characteristics, it is far from being complete enough to use as a basis for establishing specifications that will guarantee a satisfactory insulating oil. Probably the most important characteristic of insulating oil is its stability and resistance to the formation of sludge. Subcommittee IV of A.S.T.M. Committee D-9 has done a great deal of work on this subject during the past five years. A paper entitled "Testing for Sludge in Mineral Transformer Oils," by F. M. Clark and E. A. Snyder, was presented at the last Annual Meeting of the Society, giving a summary of the results obtained by Subcommittee IV to date. Further work has been outlined for the coming year and it is hoped that eventually we will be able to add to the Standard Method a satisfactory sludge test.

Subcommittee IV is also working on the development of other important test procedures applicable to insulating oils in general but not necessarily transformer oils. Such methods as power factor and resistivity tests, gas content of oil, etc., are being developed chiefly for use on cable and capacitor oils. Subcommittee IV is also constantly engaged in the review of present test methods to improve them. One section of this subcommittee is engaged in the development of a more precise neutralization test such as the electrometric titration test. The dielectric strength test method is also being reviewed with the idea of improving it.

Subcommittee IV of A.S.T.M. Committee D-9 is also, by virtue of being the Insulating Oil Advisors group of the U. S. National Committee of the International Electrotechnical Commission, keeping in touch with important and new developments in the liquid insulation field abroad. During the past five years many reprints of articles by foreign investigators on various phases of this subject have been circulated to the members of Subcommittee IV of Committee D-9.

The author believes that Subcommittee IV is engaged in constructive and important work in the field of liquid dielectrics and extends an invitation to any reader of this article, who may have interest in this field, to attend future meetings of the subcommittee and join in its work.

Courtesy Socony Vacuum Oil Co.

Machine for testing the color of electrical insulating oils which aids in determining uniformity of shipments

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New Tables Added in Revised Marking System for Valves

A new edition of the Standard Marking System for Valves, Fittings, Flanges, and Unions, developed and adopted by the Manufacturers Standardization Society of the Valve and Fittings Industry, has just been published. The standard is No. SP-25-1936. The revision includes a rearrangement of the material and a new series of tables specifically setting forth the method of applying markings on various products. New material added includes sections on lined valves and on bolting.

Copies of SP-25-1936 may be purchased from the Manufacturers Standardization Society of the Valve and Fittings Industry, 420 Lexington Avenue, New York, at 50 cents each.

Courtesy Dennison Mfg. Co.

Use Standards in Merchandising for Better Relations With Consumers

by

H. W. Brightman

Chairman, Merchandising Division
National Retail Dry Goods Association

Up-to-date Consumer-Retailer Relations Require National Program of Cooperation with Consumer, Store Executive Tells National Retail Dry Goods Association

Every Store Should Back the Advisory Committee on Ultimate Consumer Goods in Preparing Clear, Simple Terminology, Grades and Labels Based on National Specifications, He Says

A GREAT merchant has said that the first obligation of a retail organization is to its customers—the second obligation is to its employees. If these two obligations are fulfilled conscientiously in that order, he need not be concerned about his obligation to his stockholders, because that will take care of itself.

We retailers are in the business of distribution. Ours is an opportunity and a responsibility to serve—to bring together in one convenient spot merchandise from the four corners of the earth, merchandise that is intelligently selected from the standpoint of style, quality, and good taste—and make this merchandise available to the men, women, and children of the land at a price that will make only a nominal surcharge for our services, under conditions that will make shopping easy and satisfactory.

If we, as retailers, had been fulfilling this obligation not only efficiently but to the complete satisfaction of our customers, there would not be so much current talk about the need for closer retailer-consumer cooperation. If all retailers had been adequately protecting their customers against unscrupulous methods of distribution and had been adequately educating their public in the use of intelligent buying methods; in the knowledge of how to judge value; and how to

get the most efficient use out of their purchases, the meeting tonight would have been on another subject. And furthermore, if the consuming public as a whole had a greater realization of the importance of these problems—if they themselves knew to a far greater degree all the things they really want—and if they could become more articulate about these needs—their demands would be more generally recognized.

Retailers in the past generation have done much to elevate the standards of their craft and we are all proud of the progress that has been made along many lines of consumer education. Retailers as a whole have well served their communities in distributing quality merchandise at fair prices. Many retailers have done much to educate their customers in how to assemble a wardrobe, how to sew, how to make beds, how to set tables, how to decorate a home, and how to dress children for their health and comfort. Fashion shows, fashion bureaus, Home Advisory and Interior Decoration services have helped to make the consumer increasingly aware of the progress in more efficient, more useful, more beautiful merchandise.

We have helped to educate the consumer in these directions far beyond what she might have done for herself. But now, in my opinion, the time has come to go further and give her greater help and greater assistance in showing her how to buy merchandise that will give greater service, greater durability, and greater satisfaction; education not only in style, but in value and economy to better enable her to evaluate the things we offer for sale. With the retailer accepting this responsibility in addition to those which he has filled up to now, he becomes the only true and logical purchasing agent for the consumer.

If we grant that retailers as a whole, both individually and collectively, have been backward over the years in recognizing some of their responsibilities for the education of the consumer, and for providing her with all of the things she needs and wants—then we can understand this present consumer demand for recognition in

Mr. Brightman, vice-president and general merchandise manager, L. Bamberger & Company, Newark, and chairman of the Advisory Committee on Ultimate Consumer Goods of the American Standards Association, spoke at the session on Consumer Relations at the Twenty-Sixth Annual Convention, National Retail Dry Goods Association, January 19th. His subject—Merchandising in 1937 for Better Consumer Relations—was the keynote of the session.

Representatives of important consumer groups were called upon to give their views on how the retailer can develop better consumer relations.

Facts about length, strength, wearing quality are as important as attractive displays, say consumers

Courtesy Abraham & Straus

I bespeak the active cooperation of every store member of the National Retail Dry Goods Association for this Advisory Committee on Ultimate Consumer Goods, and for myself and my colleagues who are your representatives on that committee.—*H. W. Brightman.*

Washington; the development of such agencies as the consumer research organizations who believe they have a responsibility to help the consumer get more for her money and to protect her against the unscrupulous retailer and the unscrupulous manufacturer, and who have sold thousands and thousands of consumers on the fact that there *is* such a need. We can understand these appeals of consumer groups directly to manufacturers to standardize their products and to furnish honest labels describing what their products are made of, what they will do, and how to treat them. We can understand these things, but they certainly indicate *we* have been somewhat derelict in our duty.

Consumers, individually, and consumer groups, should feel that the very first person to approach with problems concerning the buying of goods at retail is the retailer himself. If the retailer encourages this confidence and takes the aggressive lead in helping the customer, there will be no need for the consumer to appeal to other agencies, except, as the need arises for additional help beyond our control.

Let us now for a few moments ask ourselves what it is that our customers want that we have not been giving them. Do we know?—and if not, how can we find out?

We know they want fair price. We need their understanding and cooperation in fighting their battles and our battles to prevent legislation that will unnecessarily and improperly raise prices.

Retailers and Consumers Work Together on ASA Advisory Committee

The Advisory Committee on Ultimate Consumer Goods of the American Standards Association, of which Mr. Brightman is chairman, brings together retailers and consumers to coordinate the work on consumer standards under the ASA, and to make recommendations from the distributor and consumer point of view on proposed standards on ultimate consumer goods.

It is the first permanent national organization on which both consumers and retailers meet on a common basis, and which gives an opportunity for differences of opinion to be presented and ironed out during development of proposed standards.

Work on standards for hosiery, bedding, and upholstery is now going forward in subcommittees of the general committee; shrinkage, electric refrigerators, and description of the color fastness of materials are being added to the program. Surveys are now under way on shoes, bedding, and upholstery as background material for the recommendations of the Advisory Committee.

Members of the committee are:

H. W. Brightman*, chairman, Merchandising Division, National Retail Dry Goods Association and vice-president in charge of merchandising, L. Bamberger & Co., Newark, N. J., *Chairman

Ruth O'Brien*, chief, Division of Textiles and Clothing, U. S. Bureau of Home Economics, Washington, D. C., *Vice-Chairman

American Association of University Women, *Dr. Faith Williams, Dr. Elizabeth May (alt.)*

American Home Economics Association, *Ruth O'Brien, Mrs. J. C. Taylor (alt.)*

General Federation of Women's Clubs, *Mrs. J. J. Doggett*

National Association of Purchasing Agents, *G. A. Renard*

National Congress of Parents and Teachers Associations, *Florence Fallgatter, Ruth A. Bottomly (alt.)*

National League of Women Voters, *Mrs. Louise G. Baldwin, Mrs. Beatrice Pitney Lamb (alt.)*

National Retail Dry Goods Association, *H. W. Brightman, Robert Blum, E. Freedman (alt.), C. W. Dorn (alt.), D. M. Nelson, Arthur G. Kaufman, T. L. Blanke (alt.), J. P. Margeson*

U. S. Department of Agriculture, Bureau of Home Economics, *Dr. Louise Stanley, Dr. Day Monroe (alt.)*

U. S. Department of Commerce, National Bureau of Standards, *Dr. A. S. McAllister, I. J. Fairchild (alt.)*

U. S. Department of Labor, Consumers' Project, *S. P. Kaidanovsky*

Member-at-large, *Dr. Paul Nystrom*

Glamour—now one of the most effective sales tools—plus standardization — of terminology, sizes, labels — an irresistible combination in selling the discriminating buyer

Courtesy Abraham & Straus
Worsinger Photo

Full employment and ultimate prosperity can only result if we work together to keep retail prices from rising as rapidly as consumer income. Legitimate competition between manufacturers and between retailers will itself act as a brake against undue rises in retail prices, and the manufacturer and retailer who does the most intelligent and efficient job will rightfully be able to charge the consumer less for his services and thus keep prices down.

Consumer Wants Information

But in addition to fair prices, consumer interests are becoming more and more articulate in demanding fuller information about the merchandise they are buying, so that they may the better judge for themselves the value and stretch their incomes to give them more for their money. They want not only information in the way of buying aids, but they want information that will enable them to buy more easily—they want intelligent standardization of sizes, standardization of terminology, so that they can judge between conflicting claims; they want information as to how to use merchandise for greater comfort, for longer wear, for better satisfaction;—they want completely honest advertising that will tell not only the truth, but the whole truth. They want completely honest and informative *labeling*, and fully informed salesmanship, (many a sale has been spoiled and many a customer lost by our failure to fully educate the salesclerk in the knowledge of her merchandise).

There is no question but what progress has been made more recently in the direction of this type of consumer education. Throughout the country today, there are many active consumer organizations—women's county and state councils, clubs, institutions and leagues, organized generally with the prime purpose of educating the consumer and making her desires felt. The retailer himself has in many cases not been delinquent in recognizing her needs for greater assistance in buying.

A large successful New York store has a Consumer Style Board of its own. The National Retail Dry Goods Association has for some years been cooperating with government agencies and manufacturers, and more recently with consumer groups—along the lines of standards, better service, and shopping conditions—although as yet, I believe, we have scarcely scratched the surface. Some individual retailers have done an outstanding job on consumer education: witness the "Consumer's Shopping Guide" of Sears Roebuck,—the standardization and laboratory testing program of Montgomery Ward and J. C. Penney; the extensive program of Marshall Field, wholesale, with its informative labels on construction, uses, care, etc.; R. H. Macy, with its Bureau of Standards; Kaufmann's with its labeling program in collaboration with the Mellon Institute of Pittsburgh; and many others.

Real contributions are being made by such commercial laboratories as the Better Fabrics Testing Laboratories, affiliated with the N.R.D.G.A.; The

United States Testing Laboratories, with their new plan for setting up Bureau of Standards for individual stores, with a laboratory and a trained technical expert in charge for so much per week.

Some manufacturers and some manufacturing associations have also made a real contribution. Recently, for example, the National Association of Hosiery Manufacturers distributed a folder describing proposed classifications and standards for women's full-fashioned hosiery by means of a grade-labeling system. Several manufacturers of nationally advertised products and retailers also have initiated the policy of indicating on labels attached to the merchandise detailed specifications, methods of laundering, and treatment for longer wear. Better Business Bureaus all over the country, organized and maintained by retailers, have made a considerable contribution toward the elimination of misleading and dishonest advertising. The notable work of the Federal Trade Commission requires no special comment.

The United States Government, through the Consumers' Project, the Bureau of Home Economics, the Department of Commerce, and other governmental agencies, has for years been making a real contribution in the way of studies and educational pamphlets offering invaluable buying aids to the consuming public. The National Bureau of Standards has set up hundreds of specifications for use in purchasing for Federal Departments—many of which can be used as consumer standards. The American Standards Association has developed more than 300 standards which have been accepted generally and which affect a wide variety of manufactured products (although very few of them are products that directly concern the ultimate consumer).

National Committee on Consumer Goods

Within recent months, however, through the cooperation of the National Retail Dry Goods Association and a number of consumer and governmental agencies, there has been set up under the supervision of the American Standards Association an Advisory Committee on Ultimate Consumer Goods.

This Committee, of which I have the honor to serve as chairman, is at the present time working on standard specifications and standard terminology, and informative labeling on bed sheets, woven cotton materials, women's hosiery, bedding and upholstery, and several other items of merchandise. Projects recommended for future action include mothproofing and waterproofing of materials, the development of standard specifications covering measurements, construction and labeling of over 100 articles of men's, women's and children's clothing; standard counts in 9 different types of textiles; and the study of many items in the home furnishings field.

It may be that my reference to "Standards" and "Standardization" in the course of these remarks may imply to some of you that I believe consumers or retailers are, or should be, interested in standardization or regimentation of fashion or style or price. Such could not be further from the truth.

Our customers, as I understand it, want minimum standards for materials and other staple products, together with adequate publicity as to whether merchandise conforms to these minimums —then they will know whether they are buying standard or sub-standard merchandise, and, taking the price into consideration, can govern themselves accordingly. They want simple grading or staple merchandise above the minimums so they can compare grades and see if they are getting their money's worth. They want a degree of standardization in sizes both between stores and within individual stores, so they will not have to face, as they do now, in children's dress, for example, a multiplicity of size ranges between 2 and 16, and further wide discrepancies in individual sizes varying according to manufacturer, retailer, material, and price.

What Is "Colorfast"

The informed consumer, thanks to the excellent work of many consumer organizations, wants, as I see it, standardization of terminology so that "colorfast" means an adequate degree of color permanence, and not just the opposite when the words "colorfast" are preceded by that otherwise honorable word "commercially." They object to the word "standard," meaning *top* grade in *some* merchandise, and fourth grade in others; and grade "A" meaning *tops* in milk and "super colossal" tops in olives. They may want color standardization in housewares and "capacity" or "efficiency" standards in electric refrigerators. And they certainly want to know how to appreciate quality and durability, and how to get greater serviceability out of most of the things they buy.

But the vast majority of consumers are still uninformed as to the existence of quality grading of merchandise or the fact that means are becoming rapidly available where quality can be evaluated.

And it is our job as merchants, once we find out what it is our customer really wants, not only to give it to her in the merchandise we offer her, but to so organize and coordinate our buying, our advertising, our labeling, our sales signs, our windows, and our salesclerks, that they are all talking the language the consumer understands.

And don't think that any of this so-called stand-

ardization or specification business need limit or hamper the individuality of the retailer. There will always be plenty of opportunity above minimums and within grades and tolerances for an alert retailer to use his imagination, his shrewdness, his initiative, and his efficiency to give greater value and greater service than his less able competitor—for, above all, we must avoid standardization and fixing of price.

Our consumer committees, our women's organizations, our Government agencies, our associations of retailers, and our associations of manufacturers, in their program of guidance and help for the consumer, can only be successful if they have the active support and cooperation of the *individual* retailers throughout the entire country.

If we as merchants believe this all makes sense, I recommend that we, as individuals, adopt the following platform for 1937:—

First—Let us educate ourselves in the full knowledge of what our customers think of us and what they want of us—
- **By being on the floor and asking them,**
- **By seeking customer criticism and advice in our newspaper advertising, our shopping news bulletins, in our customer correspondence, and**
- **By establishing our own store Consumer Advisory Boards to know the better what our customers want.**

Second—Let us emphasize to our buyers—
- **To be in sympathy with our ideals of standards and service to customers,**
- **To be really technically expert in their lines of merchandise,**
- **To develop, with the cooperation of the manufacturer, the things that we know our customers want, including standards and specifications on staple merchandise, and adequate informative labels that will give content of materials, easily understandable specifications, methods of washing or cleaning, and directions for use to give best results and longest wear.**

Third—Let us educate our buyers, with the help of our training departments—
- **To give their salespeople full and complete knowledge of their merchandise, its value, its care, its uses, and its limitations.**

Fourth—Let us reeducate our publicity department—
- **To tell a simple, straightforward, factual story about our merchandise and our store,**
- **To be much more careful with descriptive terms, to actually weigh such words as *sale, special, very special,* etc., giving each, as one of the country's largest and most successful stores does, a definite meaning in terms of value,**
- **To take the initiative in supplying all statements of fact about merchandise issued by the store whether through newspapers, direct mail, signs, windows, or salespeople.**

Fifth—Let us set up periodic checks on our entire organization to see that our standards of merchandise and service are being maintained—
- **By careful checking and inspection of incoming merchandise,**
- **By frequent investigation and study of our assortments, and our service,**
- **By frequent Bureau of Standards reports on our merchandise, our labels, and our advertising.**

And let us keep our entire organization on its toes by regular inspirational staff meetings of our executives and our salespeople.

If the individual members of this great Association will take this problem seriously to heart, it will be possible for this and other retail organizations to take the active leadership in this country in protecting consumer interests.

We should, in my judgment, establish a Consumers' Council that will command the respect of our manufacturers associations and the confidence of the consumer groups and governmental agencies.

Through this Council we should gather suggestions and examples of achievement from all our members. We should coordinate retailers' individual efforts to understand and serve their customers. We should initiate and sponsor movements for necessary standardization, informative labeling, and completely honest advertising, in the interests of all consumers. We should obtain the necessary cooperation from manufacturing interests to put across our program. We should, in a word, champion the cause of the more than 120 million consumers of the United States in their right to fair prices, honest information, and value received.

Why Consumers Want Standard Specifications

Many consumer groups were asked to comment on how retailers can develop better relations with consumers. More facts, based on standard specifications, the consumer to have a voice in preparing such specifications, was the suggestion of some of the outstanding consumer agencies.

Following are abstracts of the remarks of several of the leading women consumers, representing organizations whose combined membership numbers well into the millions.

Need Impartial Standards as Guides To Value, Say University Women

We are asking your cooperation in establishing standards through an impartial organization on

which is represented the manufacturer, distributor, and consumer.

We want goods labeled so that we can compare two similar materials of different price and know why there is a difference in price. When we do want the best goods we want to be sure we are getting the best, but we want to be able to buy intermediate quality, too, and know we are getting what we pay for.

A recent survey shows that one-eighth of the clothes expenditures of women and girls in the moderate income families is spent for hosiery. But this buying, so important a section of the budget, has to be done very largely by guess. The American Home Economics Association has issued a booklet giving aids for buying silk hosiery, but we have found that of the seven aids given, only two can now be applied to buying in retail stores.

I hope that by the time we have another World's Fair, it will be possible to arrange an exhibit of material being sold in retail stores according to specifications established by a nation-wide, impartial, scientific organization.—*Dr. Faith Williams, American Association of University Women.*

Buying Guides Inadequate, Parent-Teachers Maintain

Some of the questions puzzling the 1,877,000 members of our National Congress of Parents and Teachers are these:

Who is to certify the certifiers? When an article is labeled "Certified" how do we know on what basis this certification has been given?

Is not the privilege of returning goods the consumers' main defence at the present time against high sales pressure and lack of standardization?

Should not the consumer expect price to be the index of quality?

Who pays for the second article in a one-cent sale if the first was ever really worth the price?

Classes in consumer education are being given in two-thirds of our public schools. Seventy-two of our colleges are giving such courses. Extension groups of almost 1,000,000 rural women are looking critically at their buying problems.

We are coming to the realization that the guides we are offered whenever we go to buy goods are inadequate.

We need standards for consumer goods and some unbiased agency to maintain them.—*Mrs. Florence Fallgatter, National Congress of Parents and Teachers Associations.*

When Will We Get Action? Asks U. S. Bureau Executive

When are we going to get action on standards and labels for consumer goods? For 15 years I have been coming to these meetings, and for 15 years we have talked about information for the consumer, but up to now the action that has been taken could be counted on the fingers of our two hands.

Only a very few stores have bureaus of standards or testing laboratories, only two or three manufacturers of bedding are using specifications and putting labels on their product. One manufacturer of rugs uses labels, but we in Washington know that in at least one store the clerks remove these labels the minute the rugs arrive in the store.

Take sizes for ready-made garments, for instance. Johnny and Father may now wear blouses and pajamas made according to Commercial Standard sizes, but what about Suzy? Suzy is aged 4. Mother goes to town to get her a dress. If she brings home a dress marked Age 4 will it fit Suzy? Most probably not. So mother must take Suzy with her when she goes shopping. She finds that when she goes from one store to another the sizes are not uniform. Perhaps a size 5 fits Suzy in one store, a six in another. And when Suzy is completely outfitted, what do we find? She wears a Size 6 dress, size 10 underwear. size 11 shoe.

These are the problems the consumer is getting impatient about.—*Ruth O'Brien, chief, Division of Textiles and Clothing, U. S. Bureau of Home Economics.*

Other organizations whose representatives were called upon to speak at the Consumer session are: American Home Economics Association, National League of Women Voters, New York City Federation of Women's Clubs, United States Department of Labor Consumers' Projects, National Bureau of Standards Division of Trade Practice, AAA Consumers' Counsel.

French Automobile Committee Uses American Standard on Safety Glass

Members of the Bureau International de Normalisation de l'Automobile have shown so much interest in the American Standard for safety glass for automobiles that the Bureau has asked the American Standards Association for permission to translate the standard into French.

The Bureau is the committee of the French national standardization body (Association Francaise de Normalisation) which holds the secretariat for the International Standards Association committee on automobiles, ISA 22.

Producers Determine Usage in Selecting Standard Sizes for Coarse Aggregates

by

A. T. Goldbeck

Engineering Director, National Crushed Stone Association, Inc.[1]

Two groups of sizes, promulgated by Division of Simplified Practice, National Bureau of Standards, as Simplified Practice Recommendation R163-36, expected to meet needs of different communities

Recommendation, already widely accepted, helps both producer and user

SIZES of that indispensable group of construction materials known as coarse aggregates—sand and gravel, crushed stone, and air-cooled blast furnace slag—which in the past have been so varied that they showed differences as small as a fraction of an inch, are now, with the acceptance of the Simplified Practice Recommendation on Coarse Aggregates, well on the way toward simplification and unification.

Aggregates have a wide field of usefulness. They occupy approximately seven-tenths of the volume of Portland cement concrete used for various construction purposes and an even higher volume of the various types of bituminous mixtures used in highway construction. They are used for ballasting thousands of miles of railroad track in the United States. Aggregates find great usefulness in roofing, in sewage disposal filters, in sugar and glass manufacture, in the chemical and metallurgical industries, and other industries of a lesser magnitude. By far the greatest tonnage, however, is used for the various types of construction involving concrete, in highways, and for railroad ballast. For highway construction many different types of surfacings are used, such as gravel surfaces, waterbound macadam, a wide variety of bituminous mixtures, and Portland cement concrete.

When it is realized that highways are built under the jurisdiction, not only of the 48 States, but also of the various counties, townships, and municipalities as well as the Federal government in its various branches, each with independent ideas as to the proper sizes of materials for the various types of construction, it can well be understood why, for highway work alone, a multitude of different sizes are specified throughout the country. Then, too, each railroad organization seems to have its individual opinion as to what constitutes the proper size of aggregate for railroad ballast.

Variations Expensive

Many commercial plants are so situated that they are called upon to supply materials for many different types of construction, under many different specifications. Frequently, these jobs are of the same general character, yet the specifications are different because of the individual ideas of the various engineering organizations under

[1]Current Chairman of Division of Simplified Practice Sttanding Committee on Standardization of Sizes of Coarse Aggregates.

whose jurisdiction the work is being done. Sometimes, for the same type of jobs, aggregate sizes are required to vary by fractions of an inch. Although these size variations produce no practical difference in the value of the final structure, yet, because of the difference in sizes specified, the producing plants are put to considerable trouble and expense in their endeavor to satisfy the requirements.

300,000,000 Tons a Year

There are roughly some 4,000 to 5,000 producing plants in the United States and in peak years they have turned out well over 300,000,000 tons of aggregates. Thus the aggregates industry is a large one in point of tonnage production and in the number of units supplying materials. Accordingly, the possibility of effecting tremendous savings in manufacturing costs through reduction in the required number of sizes and through consequent simplification in plant procedure is correspondingly large.

The desirability of standardizing the sizes of aggregates has been recognized for many years, not only by the industry but by engineers as well. In 1920 a Tentative Specification for Commercial Sizes of Sand and Gravel for Highway Construction was published by the American Society for Testing Materials, and in 1923 a Tentative Specification for Commercial Sizes of Broken Stone and Broken Slag for Highway Construction was also published.

Evidently, these specifications met with little favor, judging from the fact that they did not receive enough support to warrant their acceptance as standards. Probably the reason for this nonacceptance may be found in the fact that engineers are extremely loath to relinquish established practice. They have become accustomed to certain sizes for particular purposes and because of the rather large sums of money involved in the structures under their jurisdiction they do not willingly change from sizes which from past experience they know will give good results to other sizes whose performance is doubtful in their minds. This hesitation continues in spite of the fact that the changes which are required to make the sizes coincide in adjacent localities are often so small as to be negligible.

Coordination Necessary

The aggregates industries, through their national associations, have realized the importance of standardization for a number of years, and from about 1924 to 1930 they worked independently toward the development of standard sizes. Their aim was a common one and it became evident that coordination of their efforts was necessary to bring about the desired standardization.

Other technical problems were also common to the several aggregates industries. Consequently, to further the work of standardization and to solve other common technical problems, a Joint Technical Committee of the three national mineral aggregates associations (the National Sand and Gravel Association, the National Crushed Stone Association, and the National Slag Association) was formed in 1930.

One of the first efforts of that committee was the development of joint recommendations for standard sizes. The Committee found that one of the fundamental difficulties mitigating against size standardization was the lack of a generally accepted standard method for measuring size. Some States specified sizes in terms of round-opening laboratory screens, while others used square openings. Those engineers who were accustomed to think in terms of one shape of opening knew that certain sizes of aggregates stated in terms of that particular shape of opening were suitable for certain purposes, but they did not feel so sure what sizes to use when stated in terms of the other shape of opening to which they were not accustomed. Gradually, however, many state highway departments have been adopting square-opening laboratory sieves for the measurement of aggregate size, and it is now a fact that the round-opening laboratory screen is being displaced by the square-opening sieve for size measurement.

Adopt Square-Opening Sieve

Because it seemed appropriate to draw up size standards in accordance with this trend, and for other reasons of a technical nature, the Joint Technical Committee of the Mineral Aggregates Associations adopted the square-opening laboratory sieve as a measure of aggregate size.

In approaching their task of initiating a set of standard sizes the several members of the Committee contributed their knowledge of their respective industries and of the requirements for various types of construction. With this material at hand a tentative standard was produced which was submitted to the several Associations for criticism. Consultations were held with allied industries, and use was made of the trend in specification writing by certain national specification-writing groups, such as the American Society for Testing Materials and the Federal Specifications Board. Due recognition was taken also of prevailing trends in the use of certain sizes in various sections of the country. Furthermore, the very practical consideration of the feasibility of producing given sizes within definite tolerances

was carefully weighed by the Committee for the purpose of avoiding sizes which would be impracticable from the production standpoint.

Because of the prevailing usage, the Committee considered it desirable to prepare two groups of standard sizes, Group A and Group B, the thought being that if Group A sizes were not suitable in a given locality, selections could be made from the Group B sizes.

As the aggregate is produced, it is separated

TABLE 1

Group A—Sizes of coarse aggregates

NOTE.—It is not intended that sizes from both groups (see group B, Table 2) will be adopted in any one locality. Each marketing area should base its specifications on the group best fitting local conditions and leading to the least change in the current specifications. Numbered sieves are those of the United States Standard Sieve Series.

PRIMARY SIZES

Size	Nominal size square openings	Amounts finer than each sieve (square openings), percent by weight													
		3½ in.	3 in.	2½ in.	2 in.	1½ in.	1 in.	¾ in.	½ in.	⅜ in.	No. 4	No. 8	No. 16	No. 50	No. 100
1B	2½ to 3½ in	[a]90 to 100	35 to 70	0 to 15											
2B	1½ to 2½ in		100	90 to 100	35 to 70	0 to 15									
3B	¾ to 1½ in				100	90 to 100	20 to 55	0 to 15							
4B	⅜ to ¾ in						100	90 to 100	20 to 55	0 to 15					
5B	No. 4 to ⅜ in								100	90 to 100	0 to 20	0 to 5			
6B	0 to no. 4									100	85 to 100				10 to 30

COMBINED AND MODIFIED SIZES

12B	1½ to 3½ in	[a]90 to 100		35 to 70		0 to 15									
23B	¾ to 2½ in		100	90 to 100		25 to 60		0 to 10							
34B	⅜ to 1½ in				100	90 to 100		30 to 65		0 to 10	0 to 5				
3A (Mod.)	No. 4 to 1 in					100	90 to 100	40 to 75	5 to 20		0 to 5				
345B	No. 4 to 1½ in				100	95 to 100		35 to 70		10 to 30	0 to 5				
45B	No. 4 to ¾ in						100	90 to 100		20 to 55	0 to 10	0 to 5			
456B	0 to ¾ in						100	90 to 100		30 to 65	10 to 25				0 to 10
56B	0 to ⅜ in								100	90 to 100					0 to 25
5B (Mod.)	No. 8 to ⅜ in								100	90 to 100	10 to 30	0 to 8			
45B (Mod.)	No. 8 to ¾ in						100	90 to 100		30 to 65	5 to 25	0 to 5			
G1[b]	No. 50 to 1½ in					100	80 to 100		50 to 80		20 to 40	15 to 35	5 to 25	0 to 10	0 to 2
G2[b]	No. 8 to 1½ in					100	65 to 100		35 to 75		10 to 35	0 to 10	0 to 5		
G3[b]	No. 4 to 1½ in					100	60 to 95		25 to 60		0 to 15	0 to 5			

TABLE 2

Group B—Sizes of coarse aggregates

NOTE.—It is not intended that sizes from both groups (see group A in Table 1) will be adopted in any one locality. Each marketing area should base its specifications on the group fitting local conditions and leading to the least change in the current specifications. Numbered sieves are those of the United States Standard Sieve Series.

PRIMARY SIZES

Size	Nominal size square openings	Amounts finer than each sieve (square openings), percent by weight													
		4 in.	3½ in.	2½ in.	2 in.	1½ in.	1 in.	¾ in.	½ in.	⅜ in.	No. 4	No. 8	No. 16	No. 50	No. 100
1A	2 to 3½ in	100	90 to 100		0 to 15										
2A	1 to 2 in			100	90 to 100	35 to 70	0 to 15								
3A	½ to 1 in					100	90 to 100		0 to 15						
4A	No. 4 to ½ in							100	90 to 100	40 to 75	0 to 15	0 to 5			
5A	0 to no. 4								100		75 to 100				10 to 30

COMBINED AND MODIFIED SIZES

12A	1 to 3½ in	100	90 to 100		25 to 60		0 to 15		0 to 15		0 to 5				
23A	½ to 2 in			100	90 to 100		20 to 55		10 to 30		0 to 5				
234A	No. 4 to 2 in			100	95 to 100		35 to 70		25 to 60		0 to 10				
34A	No. 4 to 1 in					100	90 to 100								
345A	0 to 1 in					100	90 to 100		30 to 65		10 to 25				0 to 10
45A	0 to ½ in							100	90 to 100						0 to 20
3A (Mod.)	No. 4 to 1 in					100	90 to 100	40 to 75	5 to 20		0 to 5				
4A (Mod.)	No. 8 to ½ in							100	90 to 100	40 to 70	5 to 25	0 to 5			
5B (Mod.)	No. 8 to ⅜ in								100	90 to 100	10 to 30	0 to 8			
G1[c]	No. 50 to 1½ in					100	80 to 100		50 to 80		20 to 40	15 to 35	5 to 25	0 to 10	0 to 2
G2[c]	No. 8 to 1½ in					100	65 to 100		35 to 75		10 to 35	0 to 10	0 to 5		
G3[c]	No. 4 to 1½ in					100	60 to 95		25 to 60		0 to 15	0 to 5			

[a] 11 per cent finer than 4 inches.

[b] The requirements for grading depend upon the percentage of crushed particles in gravel. Size G1 is for gravel containing 20 per cent or less of crushed particles; size G2 is for gravel containing more than 20 per cent and not more than 40 per cent of crushed particles; size G3 is for gravel containing crushed particles in excess of 40 per cent.

into a certain number of size divisions and the sizes thus prepared are known as primary sizes. These primary sizes are not suitable for all types of construction, but when two or more of them are combined, or when they are modified by further screening, they form still another group of sizes known as combined or modified sizes, and from these a wider selection may be made.

It is the intention of the Committee that, as far as practicable, all of the sizes used in a given locality be selected from one of these two groups, but not from both of them. If specifications require sizes from both Group A and Group B, the difficulties of production are multiplied by requiring extra screening operations, more frequent changes of screens, and extra storage space in the producing plant.

The sets of standard sizes finally recommended to the Division of Simplified Practice and promulgated by the Division as Simplified Practice Recommendation R163-36 are included in the accompanying tables Nos. 1 and 2 as Group A and Group B sizes, respectively.

Already a large number of consumers and producers have accepted this Simplified Practice Recommendation. When these standards are finally written into local specifications, either in their present form, or as they may be modified in the future as the result of additional experience, the present wide diversity of sizes now in use should become much simplified. Both producer and consumer will be benefited, the producer because of simplification in his operation, and the consumer because of the higher standard of accurate sizing made possible and the resulting fewer causes for rejection.

Marshall Field Labels Its "Fieldcrest" Brand

Adopting the principle of providing information for the consumer on labels attached to goods purchased over the counter, Marshall Field & Company Manufacturing Division are now labeling all goods sold under their own brand name "Fieldcrest."

Before the labels were prepared a survey was conducted to determine what information consumers most frequently ask for. All of the questions could be answered under four general headings, it was found. "Fieldcrest" labels, therefore, carry information for the consumer under these four standard heads:

What it's made of
How it's made
Service it will give
Best care for longer wear

An attempt is made to give definite, scientific information in non-technical terms which any buyer can easily understand. The two labels in the illustration on this page show the information provided for two different grades of pillow cases.

Fieldcrest merchandise is tested and certified by the Better Fabrics Testing Bureau, the official testing bureau for the National Retail Dry Goods Association and the Association of Buying Offices.

Wires Not Textiles

"A.S.T.M. Textile Committees Expand Standards Program," said a headline on page 23 of INDUSTRIAL STANDARDIZATION, January, and the article forthwith discussed the American Society for Testing Materials' program for testing the corrosion resistance of wire and wire products.

The title should have read "A.S.T.M. Tests Metal Corrosion As Basis for Coating Standards."

ASA Committee Keeps Standard On Dry Cells Up-to-Date[1]

by

G. W. Vinal[2]

Chairman, Sectional Committee C18 on Dry Cells and Batteries

Revision Includes Dry Cells for Industrial Flashlights and Hearing-Aid Devices in Standard for First Time

American Standards Association Approves Revised Standards

APPROVAL of the revision of the American Standard for Dry Cells and Batteries, C18-1937, on January 4, 1937, marks the completion of another step in the development of a specification which had its inception in the need for a purely governmental standard during the critical years of 1917 and 1918. As early as 1912 the American Electrochemical Society recommended standard methods of testing dry cells. Although much has been accomplished since that time, the influence of these recommendations on some of the tests now in use is still discernible.

The preparation of nationally recognized specifications to include sizes of cells, arrangement of batteries, tests, and required performance began in 1917 with the drafting of specifications which were later submitted by the National Bureau of Standards to a committee consisting of representatives of manufacturers, the War Industries Board, and several governmental departments.

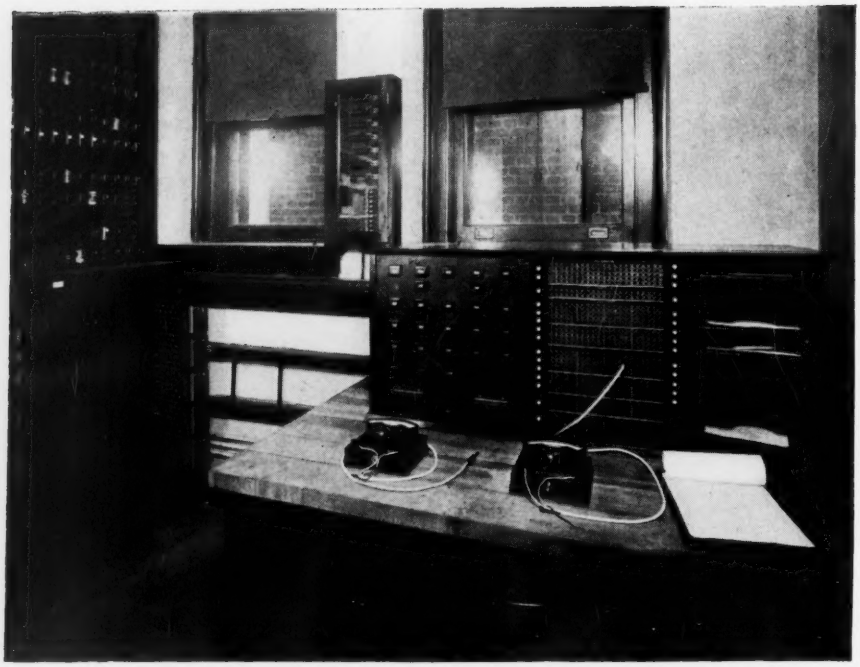
Within a few years the need for revision of these specifications became apparent, and representatives of certain manufacturers took the initiative in asking the Bureau to call a conference to consider the matter. This conference met in 1921 and agreed on a standardization program for sizes of cells and batteries, tests, and performance requirements. The completed specification became known as U. S. Government Standard Specification No. 58.

In 1924 another committee consisting of representatives of the Government, battery manufacturers, and several large users of dry cells agreed on a standard system of nomenclature for the various types and sizes of cells and batteries. An even more important result of this committee's work, however, was the movement to establish a more representative and permanent organization to deal with subsequent revisions of the specifications. As a result, the American Standards Association (then known as the American Engineering Standards Committee) authorized the formation of a sectional committee on dry cells under the administrative leadership of the National Bureau of Standards. This committee has been active since its organization in 1926, and has prepared three revisions of the specifications which became American Standards in 1928, 1930, and 1937.

Close cooperation has been maintained between this sectional committee and a technical committee on dry cells reporting to the Federal Specifications Executive Committee, with the result that Federal Specifications issued in 1931 and 1935 have been concordant with the American Standard Specification although differing in form.

[1]Publication approved by the Director of the National Bureau of Standards of the U. S. Department of Commerce.

[2]Physicist, National Bureau of Sttandards, Washington, D. C.



Apparatus for testing dry cells

A few of the cells, switches, and resistance coils are shown at the left. Voltage of the cells is read at the telephone jacks at the right. The meters have high resistance, 500 to 2,000 ohms per volts.

Courtesy National Bureau of Standards

Periodic revisions of the American Standard specification have become necessary as a result of changes in the art. Within the past few years new types of cells have been developed to meet new industrial uses and the available output of the better brands of older types is now three to four-fold greater than twenty years ago. Because of these developments, the new specifications just approved, cover for the first time batteries for industrial flashlights and hearing-aid devices.

How great the advances have been during the past few years may be judged by a few examples taken from a recent paper by C. A. Gillingham.[2] The performance figures which he gives relate to the better brands of cells available at the time, but they are not necessarily confined to the product of any particular manufacturer. A summary of the service output between 1910 and 1935 is given in Table 1.

Gillingham reports also that the proportion of

[2]Trans. Electrochem. Soc. 68, p 159 (1935).

Table I

Service output of the better brands of dry cells and batteries, 1910 to 1935.

Kind of Cell and Test	*Unit of Service*	*1910*	*1916*	*1918*	*1926*	*1930*	*1932*	*1934*	*1935*
Telephone Cells, No. 6, Light intermittent test	Days	155	165	—	230	360[1]	—	450[1]	—
Flashlight cells, D size 4-ohm intermittent test	Minutes	260	380	—	550	625	—	750	—
Radio B-batteries, D size 5000-ohm continuous test	Hours	—	—	377	1000	1400	—	1500	—
Industrial-flashlight cells. Heavy industrial test	Minutes	—	—	—	—	250	390	725	975
Hearing-aid batteries (CD size) Heavy hearing-aid test	Hours	—	—	—	—	—	18	38	50

[1]Special grades of telephone cells.

the poorer brands of cells on the market has decreased during the past few years. He finds the "shelf-life" of dry cells improved and says that the spontaneous shelf deterioration of the ordinary No. 6 type of dry cell for general purposes, occurring in 6 months, has been reduced from 35 per cent in 1901 to 7 per cent in 1934.

The specifications also provide a variety of tests, most of them involving intermittent discharges according to some fixed program. These require considerable time for completion. The test which represents best any particular condition of service, of course, is the one which covers approximately the same period of time as the cells would be in actual use.

Systematic Testing Program

To meet a situation that is admittedly difficult for the testing laboratory, an interdepartmental committee recommended in 1924 that the National Bureau of Standards should undertake systematic tests at stated intervals on the product of those manufacturers who were willing to cooperate. These tests, known as "qualification tests," include the intermittent and long-time tests which are necessary to demonstrate the quality of the product. The results of these tests are available to Government purchasing officers, and each manufacturer is informed of the results on his own product.

The industry cooperated readily in these qualification tests, and the National Bureau of Standards was confronted with the problem of handling a large volume of testing without permitting it to absorb a disproportionate share of the Bureau's personnel and resources.

This problem was solved successfully by installing an automatic testing equipment, constructed in large part of materials used in the telephone field. The discharge of the cells through fixed resistances is controlled by clocks and program machines.

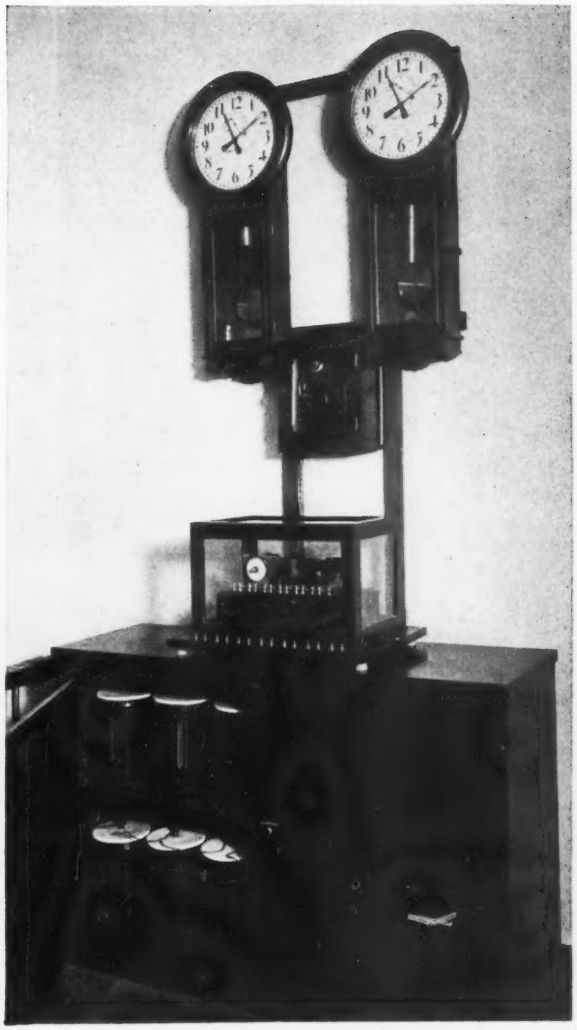
Readings of the terminal voltage of each cell while on discharge are made quickly and easily by voltmeters of especially high resistance which are connected to the terminals of successive cells through a so-called telephone switchboard. Message registers are used to count the closures of the gang relays, shown in the lower left portion of the figure. Each of these gang relays closes 20 individual test circuits through gold-plated switches.

Test Several Thousand Yearly

Routine testing of several thousand cells and batteries each year is thus accomplished easily and inexpensively.

Advances in the quality of dry cells were made possible by the ability and willingness of manufacturers to improve their product. The resulting benefits are shared by the Government and public alike. The National Bureau of Standards is glad to have had a part in this work.

Future revisions of the specifications will undoubtedly become necessary, as they have in the past, because the value of the specifications depends on their keeping pace with advances made in the art.



Courtesy National Bureau of Standards

Automatic equipment for controlling tests of dry cells. If one clock should stop, the tests will be continued by the other. Power to operate the program machine is supplied by batteries of the railway signal type in the cabinet.

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Design and Operation of Exhaust Systems, 40c.

(Report prepared by a committee of experts under the administrative leadership of the International Association of Industrial Accident Boards and Commissions)

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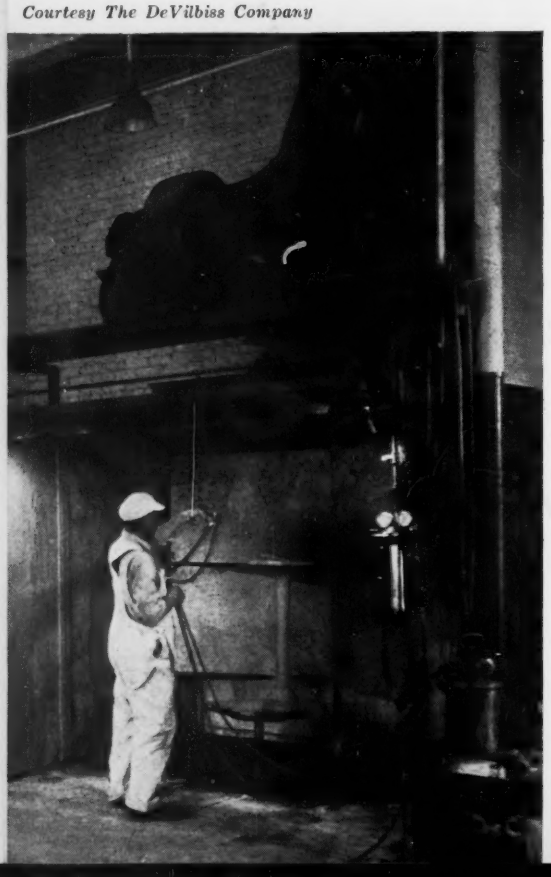

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